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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,235	12/03/2001	Sadao Kadokura	011516	5061

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 12/19/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,235

Applicant(s)

KADOKURA, SADAO

Examiner

Steven H VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 11(61) (see Figure 2B). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: "previously" is misspelled on page 8, line 26 and "an" should be "a" on page 14, line 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "facing-targets-type sputtering" in claims 1-18 is a relative term which renders the claims indefinite. The term "facing-targets-type sputtering" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The

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word "type" renders the claims indefinite. It is recommended that Applicant delete the word "type" to overcome the rejection.

6. The term "box-type" in claim 14 is a relative term which renders the claim indefinite. The term "box-type" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The use of the word "type" renders the claim indefinite. It is recommended that Applicant delete the word "type" to overcome the rejection.

7. In claim 2, the limitation "to face the opening not covered with said target opening" is unclear because it is unclear where the opening previously was located. For example, a square box has six sides. Placing items on two opposing sides leaves four open sides. Applicant has claimed a "box unit" for claim 2, so it is unclear which of the open sides the substrate would be facing, as they all are not covered with an item.

8. Claim 4 recites the limitation "the paired targets" in lines 6-7. There is insufficient antecedent basis for this limitation in the claim.

9. Claims 5-18 depend from claim 4 and contain all of the limitations of claim 4. Therefore, claims 5-18 are rejected for the same reasons as claim 4.

10. Claim 18 recites the limitation "the metal film" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 4, 5, and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,842,708 to Kadokura et al. (Kadokura) in view of US 4,931,169 to Scherer et al. (Scherer) and US 4,784,739 to Kadokura et al. (Kadokura II).

13. For claim 1, Applicant requires a facing-targets sputtering apparatus comprising a vacuum chamber, a pair of target units with targets facing the vacuum chamber, a substrate holder beside a discharge space between the targets, and a power supply unit for supplying DC power and HF power to the targets. Each target unit has a cooling block, a magnetic field generation means, and electron reflection means for reflecting an electron to the discharge space.

14. For claim 4, Applicant requires a facing-targets sputtering method comprising: generating a magnetic field extending between two targets that are a predetermined distance away from each other so as to surround a discharge space between the targets and performing sputtering. During sputtering, electrons are reflected by use of electron reflection means and power is generated by HF power and DC power applied to the targets.

15. Kadokura discloses a facing targets sputtering apparatus (Figure 1) comprising a vacuum chamber 10, a pair of target units 15, 16 that each have targets T₁, T₂, a substrate holder 41 at the side of a discharge space between the targets (Figure 1), and a power supply to the targets 50. Magnetic means 152, 162 are also preset as well as a cooling block 151, 161 for each target. Kadokura also discloses a sputtering mean using the apparatus (Example 1).

16. Kadokura does not disclose HF and DC power to the targets or an electron reflection means.

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17. Scherer discloses that adding a HF component of power over a DC component of power is beneficial because it eliminates arcing (col. 3, l. 45-50).

18. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kadokura to utilize HF power with the DC power because of the desire to eliminate arcing.

19. Kadokura II discloses that an electron-reflecting electron is beneficial in a facing target sputtering apparatus because it reflects or rebounds electrons away from the magnetic means (col. 6, l. 16-21).

20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kadokura to utilize electron reflection means because of the desire to reflect electrons away from the magnetic means.

21. For claim 5, Applicant requires a circular magnetic field to be generated at a peripheral edge of the target. The magnetic arrangement of Kadokura would also have a circular magnetic field at a peripheral edge portion of each target (Figure 7).

22. For claim 8, Applicant requires the electron reflection mean and the targets to be made of the same material. Kadokura II discloses that the electron means and targets should be the same material (col. 8, l. 42-47).

23. For claim 9, Applicant requires the targets to be Cu, Al, or alloys thereof. Kadokura discloses that the targets can be metal (col. 3, l. 19-23). Copper and aluminum are known metals. Use of any known metal is obvious according to Kadokura II.

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24. For claim 10, Applicant requires the film to be formed at a gas pressure of 0.5 Pa or lower. For claim 12, Applicant requires the pressure to be 0.05 Pa or lower. Kadokura discloses that the pressure can be 1×10^{-6} Torr (Example 1) which equals 1.33×10^{-4} Pa.

25. For claim 11, Applicant requires the film to be a conducting film. For claim 13, Applicant requires the film to be a metal film. When copper or aluminum is used (which is obvious as described above), the film is metal and conductive.

Allowable Subject Matter

26. Claim 2 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

27. Claims 3, 6, 7, and 14-18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

28. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious over the prior art of record to have a facing-targets sputtering apparatus as claimed in claim 2 comprising a box unit having a discharge space formed therein with at least three openings in three side faces thereof.

29. It is also neither anticipated nor obvious over the prior art of record to have a facing-targets sputtering method as claimed in claim 6 wherein the side faces of the discharge space are closed except for a side face which faces the substrate.

30. It is also neither anticipated nor obvious over the prior art of record to have a facing targets sputtering method as claimed in claim 14 wherein the sputtering unit is a box unit.

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31. Kadokura discloses two facing targets, but the apparatus is not a box unit. US 6,328,857 B1 to Anzaki et al. (Anzaki) and US 6,156,172 to Kadokura (Kadokura III) each disclose a box unit for sputtering, but Kadokura III is not prior art under 35 USC 102(e) and Anzaki places the substrate in the center of all the targets.

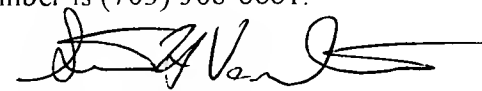
Conclusion

In the event that papers are missing from this communication, please contact the Customer Service Center for Technology Center 1700 at (703) 306-5665.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (703) 305-4473. The examiner can normally be reached on Mon - Thurs (7:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Steven H VerSteeg
Primary Examiner
Art Unit 1753

shv
December 16, 2002